

Appl. No. 10/587,640
Amdt. Dated June 26, 2009
Reply to Office Action of December 26, 2008

••• REMARKS / ARGUMENTS •••

The Official Action of December 26, 2008 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with the following remarks, are believed to be sufficient to place the application into condition for allowance.

By the present amendment independent claim 1 has been changed to recite that at least one of polypropylene glycol, a polypropylene glycol-terminated monomethyl ether and a propylene glycol adduct of glycerine, each having a molecular weight of 250-5,000 is used as an emulsification aid.

Support for this change to independent claim 1 can be found in the first full paragraph on page 7 of applicants' specification.

It is believed that this change to the claims is properly enterable after Final inasmuch as the Examiner has acknowledged on page 6 of the Office Action that "It is acknowledged that it is not Applicant's intent that the polypropylene glycol compound is a comonomer, but this possibility is not excluded."

This change to the claims is commensurate with applicants' intent which the Examiner was aware of and therefore this change is not believed to raise any new issues that have not been previously considered by the Examiner.

Entry of the changes to the claims is respectfully requested.

Claims 1-6 are pending in this application.

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Claims 1-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,876,617 to Sato et al. in view of U.S. Patent No. 5,055,538 to Amimoto et al.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art of record and therefore, the outstanding prior art rejection of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Sato et al., as disclosing:

...a method for producing an acrylic copolymer (Abstract, C2/L8-23), which comprises emulsion polymerizing a monomer mixture of (a) 30-70% by weight of perfluoroalkylalkyl (meth)acrylate (Abstract, C2/L9-16), represented by the following general formula:



(where R is a hydrogen atom or a methyl group, R' is a linear or branched alkylene group having 1-8 carbon atoms, and Rf is a perfluoroalkyl group having 4-16 carbon atoms) (Abstract, C2/L9-16), (b) 25-60% by weight of stearyl (meth)acrylate (Abstract, C2/L16-17), and (d) 0.1-5% by weight of N-methylol (meth)acrylamide (Abstract, C2/L8-23) in the presence of a non-ionic and/or cationic surfactant (C3/L9-22) wherein a polypropylene glycol-based compound is used as an emulsification aid (C3/L5-8).

The Examiner states that:

Sato et al. discloses not more than 5% by weight of hydroxyalkyl (meth) acrylate (C2/L20-23).

The Examiner concedes that:

Sato et al. does not disclose 0.1-5% by weight of (meth)acrylamide.

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The Examiner has accordingly relied upon Amimoto et al. as teaching:

...a method for producing an acrylic copolymer (C6/L19-68, Table 4). Amimoto et al. further teaches hydroxyalkyl (meth)acrylate is equivalent to (meth)acrylamide, since both compounds have similar functions, which is to increase water-and-oil-repellency and durability of the water- and oil-repellent (C3/L27-60, C3/L67-C4/L5).

Additionally, Amimoto et al. teaches that the amount of (meth)acrylamide is 0.1-5% by weight (C3/L48-60).

In combining the teachings of Sato et al. and Amimoto et al. the Examiner takes the position

that:

...it would have been obvious...to substitute the (meth)acrylamide for the hydroxyalkyl (meth)acrylate of method of Sato et al., since substitution of equivalent water- and oil-repellency agents requires no express motivation, as long as the prior art recognizes the equivalency.

It is noted that Sato et al. claims priority to Japanese application No. 9-60132 which corresponds to Japanese application publication No. 10-237133 which is cited and discussed on page 1 of applicants' specification. As discussed, problems associated with Sato et al. include problems with mechanical emulsificability and polymerization stability, and the resulting emulsion fails to fully satisfy the emulsion stability, preservation stability and further washing stability when used as a water and oil repellent. (See applicants' paragraph [0002])

Applicants' invention is presented as addressing and overcoming the problems noted with Sato et al.

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An acrylic copolymer according to the present invention is prepared from the following monomers:

- (a) perfluoroalkylalkyl (meth)acrylate
- (b) stearyl (meth)acrylate
- (c) (meth)acrylamide
- (d) N-methylol (meth)acrylamide
- (e) optionally, hydroxyalkyl (meth)acrylate.

A polypropylene glycol-based compound having a molecular weight of 250-5,000 is used as an emulsification aid together with a non-ionic and/or cationic surfactant for emulsion polymerization.

In the case of using a polypropylene glycol-based compound as an emulsification aid, the emulsion stability of the aqueous dispersion, given by percent weight precipitates and 10%, 50% and 90% particle sizes are improved as discussed in applicants' paragraph [0019].

As noted above, Sato et al. has the same problems that are discussed in applicants' paragraph [0002].

In this regard, Sato et al. teaches a copolymer that is prepared from the following monomers:

- (a) perfluoroalkylalkyl (meth)acrylate (FAAC, etc.)
- (b) stearyl (meth)acrylate (STAC, etc.)
- (c) 2-chloroethyl vinyl ether (CEVE)
- (d) N-methylol (meth)acrylamide (NMAM, etc.)

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(e) optionally, hydroxyalkyl (meth)acrylate (HAMA, etc.)

A copolymer of FAAC/STAC/CEVE/AM/HEMA is found in Examples 1-6 of Sato et al.

At column 2, lines 44-49 Sato et al. teaches that:

2-chloroethyl vinyl ether as component (c) of the present copolymer is copolymerized in such a proportion as to take about 1 to about 15% by weight, preferably about 5 to about 15% by weight, of the polymer. Below about 1% by weight, no improvement of water- and oil-repellence will be attained.

In a comparison of Comparative Example 5 of Sato et al. in which HCPMA (2-hydroxy-3-chloropropyl methacrylate is used with Example 2 in which CEVE is used as component (C), it is noted that Sato et al. concludes:

Since monomer (c) whose side chain is connected to the ether bond, the side chains have a sufficient degree of freedom and the feeling is never impaired (Example 2- Comp. Ex.5).

Thus, Sato et al. teaches and emphasizes the advantage of CEVE copolymerization, According to Sato et al, when the copolymer which is not copolymerized with CEVE (2-chloroethyl vinyl ether) is used as a water- and oil-repellent, water- and oil-repellency and washing durability of natural fibers such as cotton cloth, mixed spun cloth of cotton/polyester is poor (See comparative Example 3).

However, in complete contrast to the teachings of Sato et al. the present invention demonstrates improved characteristics by using polypropylene glycol-based compounds as an emulsification aid.

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In order to distinguish their invention over Sato et al. and establish improved properties and characteristics over Sato et al., applicants have included Comparative Example 1 using FAAC/STAC/CEVE/AM/HEMA, in which AM (acrylamide) is used in place of CEVE.

As shown by the test results found in applicants' Table on page 15 of their specification, the Comparative Example 1 which corresponds to the teachings of Sato et al. shows no improvements in water repellency, oil repellency and all of the aqueous dispersion properties.

Although the Examiner has taken the position that "it would have been obvious....to substitute the (meth)acrylamide for the hydroxyalkyl of method of Sato et al.," the differences between the present invention and Sato et al. have been demonstrated by the results of using AM and CEVE.

These differences are unexpected over the teachings of Sato et al.

Therefore, applicants' claimed invention is not obvious over the teachings of Sato et al. or the combination of Sato et al. and Amimoto et al.

Moreover, these results contradict the Examiner's position that hydroxyalkyl (meth)acrylate is equivalent to (meth)acrylamide in the scope of applicants' invention and Sato et al.

Amimoto et al. teaches a copolymer which is prepared from the following monomers:

- (a) perfluoroalkylalkyl (meth)acrylate
- (b) stearyl (meth)acrylate
- (c) alkyl (meth)acrylate having C₂-C₈ alkyl group
- (d) N-methylol (meth)acrylate

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(e) hydroxyalkyl (meth)acrylate

(f) optionally, (meth)acrylamide.

In Amimoto et al. 5-50% by weight and preferably 5-25% by weight of alkyl (meth)acrylate having C₂-C₈ alkyl group is used as an essential comonomer.

Sato et al. and Amimoto et al. are distinguishable over the present invention in that (meth)acrylate is not used as a comonomer in these references.

When using a copolymer which is not copolymerized by (meth)acrylate, the monomer emulsifiability will become poor, resulting in a lower water- and oil-repellency and poor emulsion preservation stability.

Rather than the monomer composition for copolymerization, the present invention uses a polypropylene glycol-based compound having a molecular weight of 250-5,000 as an emulsification aid with non-ionic and/or cationic surfactants for emulsion polymerization.

Neither Sato et al. nor Amimoto et al. teach or suggest the use of a polypropylene glycol-based compound having a molecular weight of 250-5,000 as an emulsification aid through or in the combined use with these surfactants for emulsion polymerization.

See Sato et al. at column 3, lines 18-19 and Amimoto et al. at column 4, lines 33-35.

Although the Examiner has relied upon Sato et al. at column 3, lines 5-8 as teaching "a polypropylene glycol-based compound is used as an emulsification aid," this portion of Sato et al. discusses the use of a hydrophilic monomer that is used to facilitate emulsion dispensability and not

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an emulsification aid, and not a polypropylene glycol-based compound having a molecular weight of 250-5,000.

Moreover, column 3, lines 5-8 of Sato et al. does not teach the use of polypropylene glycol-based compound in conjunction or combination with surfactants as an emulsification aid.

As discussed in applicants' paragraph [0019] the molecular weight of the polypropylene glycol-based compound has a direct effect on the emulsion stability which will be lower outside of either end of applicants' claimed molecular weight range.

At column 3, lines 35-39 Amimoto et al. teaches that that "optionally" the copolymer may comprise repeating unit derived from other monomers, including polyethylene glycol(meth)acrylate (degree of polymerization of polyethylene glycol being from 2 to 40 which corresponds to Mw of from about 200 to about 2369).

This disclosed polyethylene glycol mono(meth)acrylate corresponds to a hydrophilic comonomer described in the applicants' specification in paragraph [0015].

Copolymer copolymerizing such a hydrophilic monomer is used to facilitate the emulsion dispersibility. Thus hydrophilic polyethylene glycol mono(meth)acrylate is used as a comonomer component to facilitate the emulsion dispersibility.

In order to distinguish between polyethylene glycol (meth)acrylate described in Amimoto et al. and the polypropylene glycol-based component of the present invention, independent claim 1 has been changed to recite that at least one of polypropylene glycol, a polypropylene glycol-terminated

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monomethyl ether and a propylene glycol adduct of glycerine, each having a molecular weight of 250-5,000 is used as an emulsification aid.

On page 6 of the Office Action under paragraph "F" the Examiner has stated:

Applicant's argument that Sato et al. discloses the use of a hydrophilic monomer that is used to facilitate emulsion dispersibility and not an emulsification aid (P10) is not persuasive. It is acknowledged that it is not Applicant's intent that the polypropylene glycol compound is a comonomer, but this possibility is not excluded.

In response to the Examiner's state opinion, independent claim 1 has been changed to recite that at least one of polypropylene glycol, a polypropylene glycol-terminated monomethyl ether and a propylene glycol adduct of glycerine, each having a molecular weight of 250-5,000 is used as an emulsification aid.

This change to independent claim 1 is believed to exclude a polypropylene glycol compound that is a comonomer, and thus the Examiner's reliance upon the prior art.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

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It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejections of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved; the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



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